

AMENDMENTS TO THE CLAIMS

The claims in this listing will replace all prior versions, and listings, of claims in the application.

Claims 1-15. (Canceled)

16. (New) A position information recognition apparatus for a cleaning robot, comprising:

a fixed plate installed in a cleaner body;

a motor fixedly installed to the fixed plate and configured to generate a rotational force;

a rotational cylinder having a rotational axis coaxial with an output shaft of the motor, the rotational cylinder configured to rotate about a predetermined angle;

a plurality of position information sensors installed to the rotational cylinder at a predetermined angular spacing to sense the surroundings of the cleaning robot; and

a moving unit configured to move the rotational cylinder up and down between retracted and elevated positions.

17. (New) The position information recognition apparatus according to claim 16, wherein the fixed plate has a disk-like shape and the lower end of the motor is connected to a central portion of the fixed plate.

18. (New) The position information recognition apparatus according to claim 16, wherein the fixed plate includes a sensor moving device for raising the position information sensor to a predetermined height so as to be exposed outside of the cleaner body in an operational state and for recessing the position information sensor into the cleaner body in a non-operational state.

19. (New) The position information recognition apparatus according to claim 16, wherein the motor comprises a bi-directional motor that rotates forward and backward over a predetermined angular interval.

20. (New) The position information recognition apparatus according to claim 19, wherein the motor has a rotational movement angle of  $\pm 45^\circ$ .

21. (New) The position information recognition apparatus according to claim 19, wherein the motor has a guide plate supporting protrusion provided at a plurality of locations at the top surface of the motor and centered about the output shaft of the motor.

22. (New) The position information recognition apparatus according to claim 16, wherein the plural position information sensors are installed at the outer surface of the rotational cylinder at intervals of  $90^\circ$ .

23. (New) The position information recognition apparatus according to claim 16, wherein the rotational cylinder includes:

an inner cylinder rotatably mounted on a top portion of the fixed plate, the inner cylinder being configured to extend about the outer surface of the motor and having an electromotive protrusion at the upper inner surface of the rotational cylinder so as to be secured with the output shaft of the motor; and

an outer cylinder secured to the upper end of the inner cylinder so as to be rotated together with the inner cylinder, the outer cylinder having the plurality of position information sensors mounted at the outer surface of the outer cylinder at uniform intervals.

24. (New) The position information recognition apparatus according to claim 23, wherein the inner cylinder has a cylindrical shape with an open top and bottom, a flange portion being provided at the lower end and extends circumferentially outwardly to rotate the rotational cylinder and a flange portion is provided at an upper end to be secured to the outer cylinder.

25. (New) The position information recognition apparatus according to claim 23, wherein the outer cylinder has an open bottom and a closed top and includes an insertion hole provided at a central top portion so as to receive a rotation guide plate.

26. (New) The position information recognition apparatus according to claim 16, wherein the rotational cylinder has a guide plate insertion hole at a top portion configured to receive a rotation guide plate secured to the motor.

27. (New) The position information recognition apparatus according to claim 26, further comprising an external display mounted at a top surface of the guide plate and configured to display information at least about an operational state of the cleaning robot.

28. (New) A body of a cleaning robot comprising:

a sensor assembly mounted for rotation at a top surface of the cleaner body to observe surroundings;

a sensor assembly receiving portion provided in the body so as to receive the sensor assembly; and

a sensor moving unit provided adjacent the sensor assembly receiving portion and configured to move the sensor assembly between exposed and retracted positions, wherein the sensor moving unit comprises:

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- a bi-directional motor having an output shaft;
- a pinion mounted on the output shaft of the bi-directional motor, the pinion being bi-directionally rotatable;
- a rack engaged with the pinion and being linearly moveable upwardly and downwardly in accordance with a rotational direction of the pinion; and
- a sensor supporting plate secured for movement integrally with the rack and secured to a mounting plate of the sensor assembly.

29. (New) The body of the cleaning robot according to the claim 28, wherein the sensor supporting plate includes at least two guide protrusions at a side surface and an elongated guide groove at a sidewall of the sensor assembly receiving portion in alignment with the guide protrusions.

30. (New) The position information recognition apparatus according to claim 16, wherein the unit includes:

- a bi-directional motor having an output shaft;
- a pinion mounted coaxially with the output shaft of the bi-directionally motor, the pinion being bi-directionally rotatable;
- a rack engaged with the pinion and being linearly moveable upwardly and downwardly in accordance with a rotation direction of the pinion; and
- a sensor supporting plate secured to the pinion and connected to the fixed plate of the sensor assembly.

31. (New) A body of a cleaning robot comprising:

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a sensor assembly mounted for rotation about a generally vertical axis, said sensor assembly being installed at a top of a cleaner body to sense the surroundings of the cleaner;

a sensor assembly receiving portion provided in the body of the cleaner so as to receive the sensor assembly; and

a sensor advancing and retracting unit formed adjacent a side of the sensor assembly receiving portion, said sensor advancing retracting unit including a motor coupled to the sensor assembly to move the sensor assembly between an advanced position in which the sensor assembly is operative to sense the surroundings and a retracted position in which the sensor assembly is retracted within the receiving portion.